

Reclamation District No. 1500

Sutter Basin Groundwater Monitoring Well

1. Project Description

<i>Project Type:</i>	Conjunctive water management/groundwater/surface water planning
<i>Location:</i>	Sutter Basin, Sutter County
<i>Proponents:</i>	Reclamation District No. 1500 (RD 1500 or District), Sutter Mutual Water Company (SMWC or Company)
<i>Project Beneficiaries:</i>	Sutter Basin, RD 1500, SMWC, State Water Project, U.S. Bureau of Reclamation (USBR)
<u>Total Project Components:</u>	Development of sub-basin groundwater supply through conjunctive management in-lieu groundwater recharge and groundwater production wells based upon findings of the groundwater investigations performed during the short-term project component
<i>Potential Supply:</i>	8,000 to 12,000 acre-feet per year (ac-ft/yr)
<i>Cost:</i>	\$3.9 million
<i>Current Funding:</i>	None
<u>Short-term Component:</u>	Pilot Study/Groundwater Program Feasibility Study
<i>Potential Supply (by 2003):</i>	1,500 to 2,000 ac-ft/yr
<i>Cost:</i>	\$550,000
<i>Current Funding:</i>	None
<i>Implementation Challenges:</i>	Site selection, lack of groundwater data, National Environmental Policy Act/California Environmental Quality Act (NEPA/CEQA) compliance
<i>Key Agencies:</i>	SMWC, Sutter County, local landowners, USBR, environmental interest groups

Summary

RD 1500 in conjunction with SMWC proposes the design and construction of a groundwater monitoring well within the Sutter Basin in Sutter County. RD 1500 includes that portion of Sutter County bounded on the north and east by the Tisdale and Sutter Bypass and on the south and west by the Sacramento River, as shown on Figure 23A-1. The gross land area within the District is approximately 67,850 acres.

SMWC, Pelger Mutual Water Company, and landowners supply irrigation water to most of the lands within the District's service area. The majority of the irrigation water in the study area is surface water diverted from the Sacramento River with a small number of wells scattered along the westerly portion of the District. Limited development of the groundwater resource has occurred largely because of the existing extensive surface water rights and USBR contracts held by the companies.

Since implementation of the Groundwater Management Plan (under AB 3030) in 1997, RD1500 has initiated a monitoring program to collect existing well-level data and surface water quality information within the Sutter Basin. Coordination of these activities with monitoring of groundwater in adjoining districts will provide a body of information necessary to proceed with further evaluation of the potential for groundwater development.

Several studies conducted since 1962 have isolated specific areas of poor-quality groundwater (connate or brackish water resulting from an artesian effect in the middle of the District) and indicated those sections within the District where relatively good water-quality supplies exist, particularly areas within the northwestern region of the basin. The objective of further investigative work is to develop recommendations regarding conjunctive use of groundwater and commingling with surface water supplies.

Short-term Component

Limited groundwater data is available for the Sutter Basin. It is necessary to cultivate a better and thorough understanding of the regional aquifer characteristics in order to develop a viable groundwater use program. Additional monitoring of both groundwater quantity and quality is necessary through a controlled environment such as a dedicated monitoring well. This project proposes a pilot program to investigate the feasibility of utilizing groundwater as part of the Basin's reliable water supply.

The short-term project component would likely include the following:

Pilot study—To determine aquifer characteristics and groundwater use feasibility (e.g. determine characteristics of aquifer recovery)

Feasibility study/collection of existing data—To determine the optimum location to conduct the pilot study and outline pilot study procedures

This task would entail review of all existing groundwater monitoring data from existing agricultural wells and well logs from natural gas exploration conducted in prior years. From this data, groundwater aquifers would be defined, and water quality analysis information would be utilized to determine the most feasible location for the monitoring

well. Additionally, site selection must also identify strata with hydraulic connection to the river and eliminate those strata that may be directly influenced by surface water recharge. Information from previous studies within the basin would also be analyzed to correlate known features in the substrata that have a direct influence on water quality.

Well/study design—The pilot study is likely to include one monitoring well that would have the capability to act as a production well (approximately rated at 1,500 gallons per minute [gpm]) when not used for monitoring. The well would be equipped with data logging equipment and appurtenances allowing for continuous collection of data for the duration of the study.

Well construction—It is anticipated that the well would be drilled to an approximate depth of 900 feet, which exceeds most other well depths in the area. The various water-bearing strata would be isolated to enable the recording of specific information from each strata and then to coordinate the results with California Department of Water Resources (DWR) monitoring well testing from the adjoining Reclamation District No. 108 (RD 108) study. Currently a well with 1,000-gpm to 1,500-gpm capacity is considered sufficient to allow for the consideration of supplemental dependable supply of irrigation water to the Company.

Data Analysis and Recommendations

All short-term project components would be expected to be completed by December 2003.

Long-term Component

The primary purpose of this memorandum is to evaluate the potential for this project to provide water supply benefits in the short-term (by end of 2003). As part of this initial evaluation, potential long-term components of the proposed project (defined as any part of the project proceeding past or initiated after December 2003) have been considered on a conceptual level. Further consideration and technical evaluation of long-term component feasibility and cost will occur as the next level of review under the Sacramento Valley Water Management Agreement. As such, long-term component project descriptions are included in these short-term project evaluations only as a guide to the reader to convey overall project intent.

The long-term goal of this project is to establish a reliable, well-defined groundwater supply within the Sutter Basin. However, an annual groundwater program cannot be instituted until reliable groundwater information is obtained and analyzed. A local groundwater program would be predicated upon reliable and thorough monitoring and modeling of the system.

Upon satisfactory completion of the pilot program, the proposed long-term project is anticipated to have the following components:

Groundwater modeling effort—The modeling effort should utilize information from such sources as the pilot program, existing DWR data and models on both the east and west sides of the Sacramento River, and monitoring results from local privately owned wells.

Utilization of private agricultural wells—The District and its sister company, SMWC, would eventually like to initiate a program that is similar to other Sacramento Valley Irrigation Districts, such as Glenn-Colusa Irrigation District to the north. The District would negotiate with local landowners to participate in a voluntary program where the landowners could

contribute to SMWC water supply via their privately owned wells. The landowners would be reimbursed at a negotiated rate per acre-foot of water.

Installation of production wells—The District would install production wells (an estimated 10) that could be leased to SMWC for water supply. The monitoring/production well from the pilot study could potentially be part of this well field should the location be deemed suitable for long-term purposes.

Should the modeling effort indicate favorable circumstances for groundwater development, the privately owned agricultural wells could potentially be on-line by the 2005 irrigation season. The new production wells could potentially be on-line by the 2006 irrigation season.

2. Potential Project Benefits/Beneficiaries

The proposed monitoring well would further define the potential for the basin and enhance use of the groundwater resources. At this time the quantity and quality of ground water available is unknown. Although no direct water supply benefits would necessarily be gained from the pilot study, the intention is to derive direct benefits from the resulting long-term project components. Beneficiaries of additional groundwater supplies would include the State Water Project, USBR, SMWC, and environmental users during critically dry periods when surface supplies are deficient.

The District has corroborated with the SMWC in cooperatively working with other water purveyors within the Sacramento Valley in the formulation of the Sacramento River Basinwide Water Management Plan. Within the document that is nearing completion, Technical Memorandum No. 3, *Water Resources Characterization*; Technical Memorandum No. 5, *Water Management Supply Options*; and *Groundwater Hydrology Technical Memorandum* all relate to appropriate management of the groundwater resource. The stakeholders, consisting of 10 water suppliers, recognize the importance of a cooperative groundwater plan to ensure long-term availability of the resource as a supplement to the continually oversubscribed surface water supply. Additionally, USBR and DWR are acting sponsors and contributors to the preparation of the plan.

3. Project Costs

The cost opinions shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation from the information available at the time of the estimate. It is normally expected that cost opinions of this type, an order-of-magnitude cost opinion, would be accurate within +50 to -30 percent. Project costs were developed at a conceptual level only, using data such as cost curves and comparisons with bid tabs and vendor quotes for similar projects. The costs were not based on detailed engineering design, site investigations, and other supporting information that would be required during subsequent evaluation efforts.

The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. As a result, the

final project costs will vary from the opinions presented here. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

Tables 23A-1 and 23A-2 present an order-of-magnitude project cost estimate for the short-term and long-term project components, respectively. Future stages of the project, from feasibility study to final design would include progressively detailed cost estimates.

TABLE 23A-1
Short-term Project Costs
Reclamation District No. 1500 Sutter Basin Groundwater Monitoring Well

Item	Quantity	Units	Unit Price (\$)	Total Cost (\$ x 1,000)	Assumptions
Pilot Study					
Land Acquisition	1	Acres	5,000	5	900-ft deep at 1,500 gpm
Production/Monitoring Well	1	Each	170,000	170	
I&C for Monitoring/telemetry	1	Each	20,000	20	
Pilot Study Subtotal ->				195	
Contingencies and Allowances (30%) ->				59	
Total Construction Costs ->				254	
Environmental Mitigation (5%)->				13	
Environ. Documentation, Design, Project Admin. of Pilot Study (25%) ->				64	
Initial Project Modeling Costs->				220	
Phase 1 Project Cost ->				551	

TABLE 23A-2
Long-term Project Costs
Reclamation District No. 1500 Sutter Basin Groundwater Monitoring Well

Item	Quantity	Units	Unit Price (\$)	Total Cost (\$ x 1,000)	Assumptions
Pilot Study					
Land Acquisition	10	Acres	5,000	50	900-ft deep at 1,500 gpm
Production/Monitoring Well	10	Each	170,000	1,700	
I&C for Monitoring/telemetry	10	Each	20,000	200	
Subtotal ->				1,950	
Contingencies and Allowances (30%) ->				590	
Total Construction Costs ->				2,540	
Environmental Mitigation (5%)->				130	
Environ. Documentation, Design, Project Admin. of Pilot Study (25%) ->				640	
Long-term Project Costs->				3,310	

4. Environmental Issues

Projects, similar in nature to that proposed, have been successfully constructed with no detrimental environmental impacts; and if groundwater resources prove to be plentiful, environmental benefits would be positive, especially during dry years.

During the permitting process for construction of the monitoring well, an initial study of environmental impacts would be prepared. It is not anticipated that the pilot study would have any significant environmental impacts. Implementation of the project may require permits from various regulatory agencies. However, until the monitoring well site is selected, the impacts are unknown. Should this project proceed to develop more extensive groundwater facilities in the region, more extensive environmental permitting and documentation may be required. Following is a summary of the likely permitting requirements for the short-term project component.

- **Federal and State Endangered Species Act**—Consultation with state and federal resource agencies (e.g., USFWS, NMFS, CDFG) may be required to protect special-status species and their habitat.
- **Advisory Council on Historic Preservation**—Consultation under Section 106 of the National Historic Preservation Act may be necessary if historical resources are affected by construction of the project.
- **California Department of Fish and Game**—If alterations to streams or lakes are required as part of project implementation, a Streambed or Lakebed Alteration agreement may be required.
- **Local governments and special districts**—Specific agreements for rights-of-way, encroachments, use permits, or other arrangements may need to be made with local entities in the vicinity of the project.

A draft CEQA checklist was not prepared for this proposed project because no physical alterations to the environment would occur as a result of this proposed action.

5. Implementation Challenges

Project implementation would cause some significant challenges. Some of these challenges are discussed below.

Coordination among Public and Private Entities

The District and Company have engaged in cooperative dialogue and planning with the Sutter County Public Works Department to develop joint and coordinated groundwater management projects and policies. Close coordination would be required among local, state, and federal entities. Reliable communication and integrated coordination would be required to create a successful project.

Lack of Sufficient Groundwater Data

The Sutter Basin has limited groundwater information available. DWR has been compiling data from its monitoring wells within RD 108 and elsewhere in the lower Colusa Basin and is working on a groundwater model for the basin.

Public Perception

Landowners may have concerns about possible groundwater overdraft. Aquifer recharge aspects of this project may tend to alleviate these concerns. Monitoring and modeling of groundwater levels would be an essential part of this project both technically and politically.

Land Acquisition

It is probable that land or easements would have to be acquired for the production wells and for new conveyance and delivery systems. Some landowners may object to acquisition of their lands.

6. Implementation Plan

The proposed short-term project would be conducted in a single phase, commencing as funding becomes available with completion in approximately 13 months. Following completion of the monitoring well construction, groundwater monitoring for quantity and quality would commence, and at the end of a 6-month period, a final report would be prepared with recommendations on the status of the groundwater resource and the viability of proceeding with production wells (see Figure 23A-2).

Task 1: Feasibility Study: Data Review and Site Selection

Landowner support would be an integral part of the site selection process along with environmental adaptability. A biological survey of the site would be accomplished prior to final site selection. (4 months)

Task 2: Monitoring Well Design, Environmental Clearance, and Permitting

The monitoring well would be designed for select strata monitoring to enable evaluation of individual aquifers to isolate those zones of poor quality and low yield in favor of those that show promise of high yield. All elements of the well would be defined including the size and type of well casing, screen type, pump and sampling equipment, and sampling procedure. An initial study of environmental impact and appropriate environmental clearance would be obtained prior to completion of the permitting process.(4 months)

Task 3: Bid Process

The bid process would include a cost proposal from a select list of qualified bidders followed by contractor selection and bid award. (1 month)

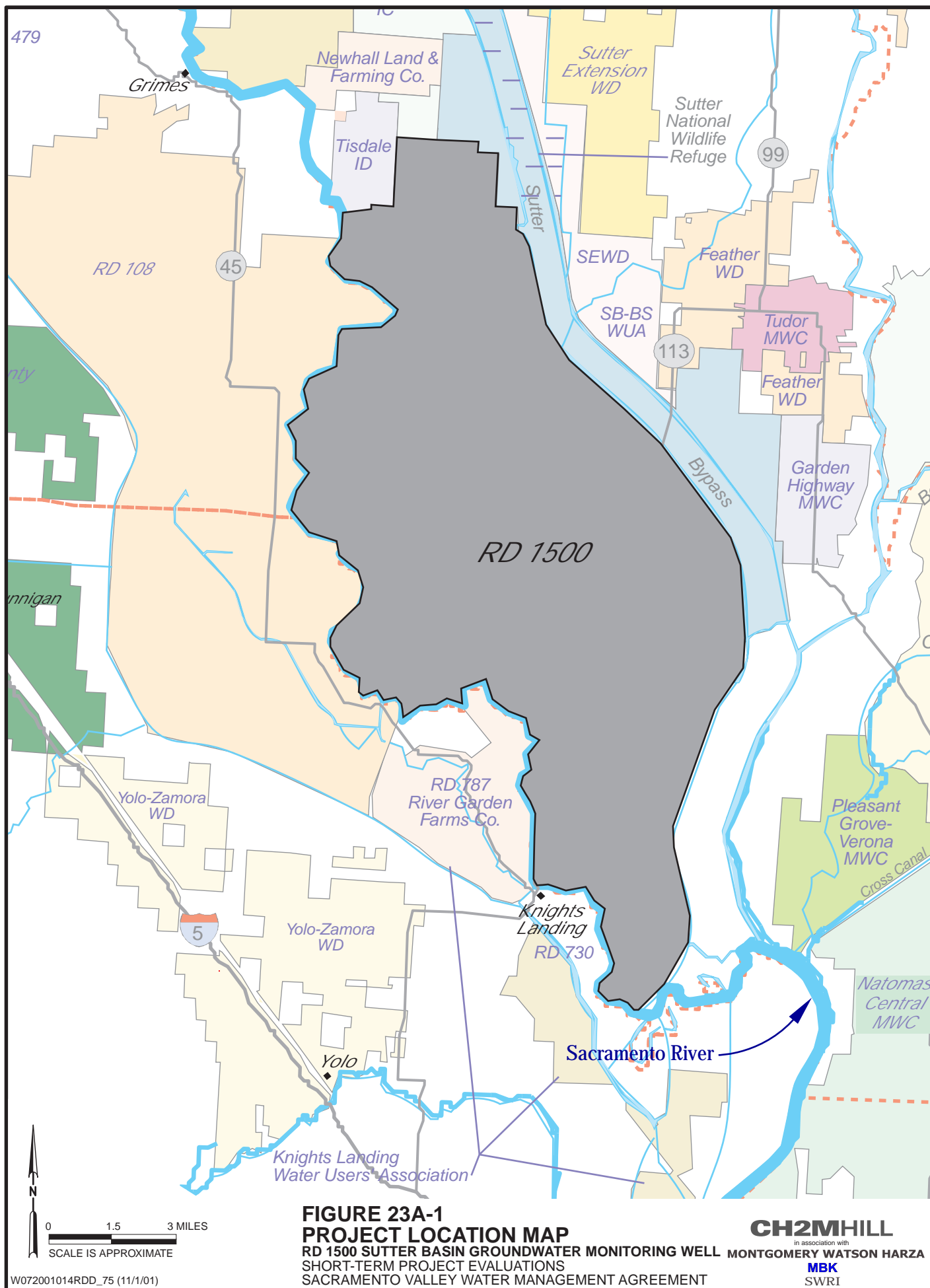
Task 4: Monitoring Well Construction

The contractor would construct a test hole and electric log the hole to determine the aquifers suitable for screening for monitoring purposes. The well would be developed and the sample extraction equipment provided to commence the monitoring program. (3 months)

Task 5: Well Monitoring, Sampling, and Report Preparation

The pilot program would be conducted over a period of 1 year and would be followed by data analysis to determine the results and probability of success in establishing additional test wells and/or production well facilities.

A report of the results would be prepared along with recommendations and conclusions on the feasibility of further development of the groundwater resource. (1 year)



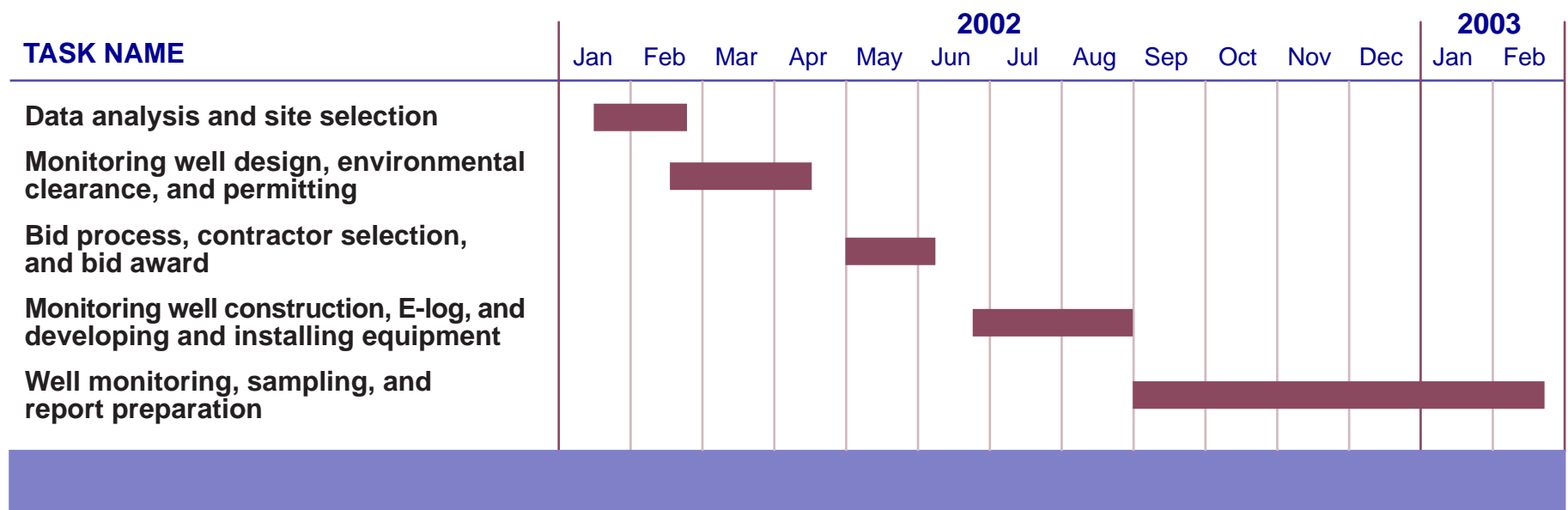


FIGURE 23A-2
PRELIMINARY IMPLEMENTATION SCHEDULE
 RD 1500 SUTTER BASIN GROUNDWATER MONITORING WELL
 SHORT-TERM PROJECT EVALUATIONS
 SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT